INDEX

SCIENTIFIC REVIEW PANEL

Irvine, California

Thursday, March 19, 1992

10:45 a.m.

- - P R O C E E D I N G S - -

CHAIRMAN PITTS: Good morning. We're here today to discuss a number of items actually. The first on the agenda is to consider the identification of 1,3-butadiene as a toxic air contaminant. We had met once before on this subject and now this second. Since that meeting we have been provided with some alterations and additions and considerations that are relevant to the final decisions of the Panel.

So we'll begin now with Part A, and Ms. Shiroma will start the ball rolling.

MS. SHIROMA: Thank you, Dr. Pitts.

CHAIRMAN PITTS: Along with the NCAA playoffs who will start the ball rolling tonight, right?

Okay, would you please start.

MS. SHIROMA: Sure. And just in brief, the Panel at the last meeting basically finished the discussion

of the Part A and provided us with some instructions to provide clarification on certain aspects of the Part A. And I believe that we provided that to you in the material that we sent you.

In the meantime, we're here if you have any other questions about either the Part A or the material sent to you. We also have Dr. Melanie Marty, Joseph Brown, and also David Holtzman here to finish your discussion of the Part B. Basically you folks were somewhat near the end but hadn't completed that discussion at the last meeting. So they're here to go ahead and finish that for you.

CHAIRMAN PITTS: So should we start on Part A?

MS. SHIROMA: If you have any questions on Part A.

CHAIRMAN PITTS: Yes, we have just a few questions, I think. I'll go through the Panel.

And Kelly and Joan, why don't you come up and we'll start. Let me just assemble this.

Do Panel Members have any questions that you'd like to bring up in terms of Part A and in terms of the proposed revisions that Genevieve sent to us a while back? And indeed Part A and B are in this document of March 4th that was sent to Panel Members.

So we'll just go around, and I'm opening it up for questions -- and on the Executive Summary, because we

have a couple on the summary.

MS. SHIROMA: Yes, that's right.

CHAIRMAN PITTS: Okay. Well, shall we just start with the Executive Summary?

MS. SHIROMA: These are described in the first three pages of the material sent to you on March 4th. So the changes we propose are on page 1, there are four bullets there.

CHAIRMAN PITTS: Okay, this is page 1 of the changes, right?

MS. SHIROMA: Yes, that's correct.

CHAIRMAN PITTS: Okay, let's see what questions there might be on page 1.

MS. SHIROMA: And basically the Panel wanted to make sure that we had fully articulated the benefits of the new phase II reformulated regulations on the trends of 1,3-butadiene and then also to clarify the indoor analysis as far as, again, articulating contribution from environmental tobacco smoke.

And then we had one calculational correction we wanted to include in the Executive Summary, and that's the fourth bullet.

CHAIRMAN PITTS: I'm just waiting, I'd be interested to hear any input. While we're waiting maybe I could raise one question on this that it may be a question

of consistency, again, in units and also may go a little bit beyond that. We have here a statement that, it's the third paragraph down, "All of the 1,3-butadiene concentrations reported in the document are given in ppbv, parts per billion volume, followed by the microgram per cubic meter equivalent."

And that's fine, except there's some confusion in some of the reporting in terms of from the Part B part from the OEHHA group because we have it in units of parts per million instead of parts per billion. And I guess a factor of 10 to the third is not a heck of a lot in the congressional bank, but in a document like this it can get a bit confusing.

An example maybe of this, then if you go below this it says, "On page 7, the estimated number of 1,3-butadiene has been raised from 3,936," which is maybe more significant figures than we'd want to admit, "to 4,200. This change is the result of the recalculation of the conversion of the 1,3-butadiene's ppm best value to microgram per cubic meter."

And I don't see how you convert units and you get a difference in the number of deaths by just changing units. I think I know what you did; I think you got a new value from OEHHA is what I think happened.

MR. HUGHES: Right.

CHAIRMAN PITTS: But it doesn't reflect that the way this is said. So you ought to think about that.

MR. HUGHES: Okay, the change from the 3,936 to the 4,200 did come from the revised best value. So all I'm saying is that the Executive Summary got changed, and that number was changed to reflect the best value that is in the document now.

CHAIRMAN PITTS: But now you see you have a value here, if you look at this it is in fact -- when you go to the comments here that are from, let me go back here. On Part B it says, "Changes to the Executive Summary," and Part B, and this really throws me, the third change to the Executive Summary: "On page 7," -- and by the way, I want to compliment OEHHA for giving the page and the paragraph and the line number. That kind of helps if we do that throughout because you're kind of scanning these things.

But it says, "change '1.6 times 10 to the minus 4 per microgram per cubic meter' to read '0.37 per part per million (1.7 times 10 to the minus 4 per microgram per cubic meter)'."

Now, I think if we stay in micrograms per cubic meter, the 1.6 to 1.7 is reflected in the 39 something to 4,200. I think that's how you really got it. But, boy, I don't see how this 0.37 ppm ought to be in ppb's.

MS. SHIROMA: In parts per billion.

CHAIRMAN PITTS: We agreed on that.

MS. SHIROMA: Right, right.

MR. HUGHES: OEHHA probably could better handle this.

MS. SHIROMA: But your point is well taken.

CHAIRMAN PITTS: And maybe that's how they do it. But when you do it in the Executive Summary you want it consistent.

MS. SHIROMA: And our intention was in the third bullet on the Executive Summary was to assure that both Part B and Part A and the Executive Summary were all consistent.

CHAIRMAN PITTS: That's right.

MS. SHIROMA: And I apologize for our missing that.

CHAIRMAN PITTS: That's okay, it needs some interaction. But I think it is important to clarify that and keep it.

And also, along that line I think we had agreed one of the things that would be useful, when you start out the Executive Summary and Part A -- well, you see for example when you have this list of the compounds we've done to date, they're all in ppbv's.

MS. SHIROMA: Right.

CHAIRMAN PITTS: Let me make a point about this. We have this list of compounds and numbers, we have those in the findings, we have included those in the findings. I would think that it would be important to include this in the Executive Summary in every one. This document, people who read the Executive Summary don't necessarily have the findings, and it's very helpful to see where a compound lies with the number in the summary versus other TACs that have been identified. So if we could do that, it's just easy enough to do.

MS. SHIROMA: Right. We can certainly do that. And it would provide just that much more information to the public.

CHAIRMAN PITTS: And let's do that in the future, let's put it in the Executive Summary. I think it's in Part A, it may be in the appendix somewhere. Where does this appear, this list, in this document?

MS. SHIROMA: Right now it appears -- it would appear in your draft SRP findings and then in your finalized findings.

CHAIRMAN PITTS: But it wouldn't be in the actual documents themselves?

MS. SHIROMA: It would become part of the Executive Summary once the SRP findings are appended to the Executive Summary.

CHAIRMAN PITTS: Okay, so they'll be there. Well, I think maybe though even before it would be helpful to have them both places.

MS. SHIROMA: Sure.

CHAIRMAN PITTS: Because at least for me I wasn't sure, when I see 1.6 times 10 to the minus 4 and compare it to everything else, that's a pretty hot tamale, it's hot. And I'd like to compare it to some others that I have some familiarity with.

MS. SHIROMA: It's definitely possible for us to add that in future documents.

CHAIRMAN PITTS: Yes, that would be fine, if you would, yes. So we'll clarify that point there.

One other thing. While we're at it why not, it might be helpful somewhere in here you might want to put the molecular weight. Remember, we were going to have an asterisk or something and say, here is the molecular weight of the compound, and then how to convert from micrograms per cubic meter to ppb. I've got them here, and there's a little equation to show how you can do it. It's just helpful to people if they want to do it.

MS. SHIROMA: Okay, all right, will do.

CHAIRMAN PITTS: It's not a big deal, but the molecular weight certainly would be nice to have because you need that to make a conversion.

We've had an interesting situation that may affect the tax policy of the State of California. Professor Byus has been telling people that we have 20 million people in the state and we've had a rapid increase to 30 million again, and that's pretty speedy. Because in your changes to summary it says, we're quoting 4,200 among a population of 30 million, and I'm never sure whether we use 20.3 or 30 or whatever that is.

MS. SHIROMA: Okay, with the recent update to the census we have been providing these numbers for a 30 million population.

CHAIRMAN PITTS: Oh, okay.

MS. SHIROMA: So we have extrapolated. The 20 million comes from the network. The 21 station network represents approximately 20 million people.

DR. BYUS: I know. But we're just being -- we're going to do it now on the total number in the state?

MS. SHIROMA: Extrapolate to the total number in the state, that's right.

CHAIRMAN PITTS: That will be the policy.

MS. SHIROMA: Right.

CHAIRMAN PITTS: Good, okay.

Are there any other points or questions?

(No response)

CHAIRMAN PITTS: Well, that's fine. I think

that takes care of that.

MS. SHIROMA: Okay, thank you. And then the Health folks will come up next.

CHAIRMAN PITTS: Fine.

DR. FRIEDMAN: Excuse me, are you talking about the whole document or just the Executive Summary and Part A?

CHAIRMAN PITTS: That's the Executive Summary and Part A. You want to be sure about the Executive Summary, if there are any other questions about that.

MS. SHIROMA: And no further questions on Part A?

(No response)

MS. SHIROMA: Okay.

CHAIRMAN PITTS: No? Fine.

Oh, by the way, some of the additions, some of the paragraphs that were added are great, they really look good. They came out very well and they are just what needs to be said. It's well done.

DR. FROINES: I just had one, when are the 25 88 data going to be out, available?

MS. SHIROMA: The first phase of the program, the greater than 25 ton per year sources, plus those districts that have a more comprehensive inventory, our emissions inventory group is expecting that towards the end

of the calendar year there should be some summaries available. They are still going through the QAQC, that information. And then the next two phases will phase in from there, the 10 to 25 ton per year sources and then the less than 10 ton per year sources.

DR. FROINES: Has industry provided the risk assessments to the State at this point?

MS. SHIROMA: The way the program works is that the risk assessments have been done for quite a few of the first phase facilities. And the way the process works, it goes to the district first then gets submitted to the Office of Environmental Health Hazard Assessment.

So Melanie's group has had an opportunity to review a number of the risk assessments. They formulate their recommendations on those and they go back to the districts. I'm not certain that any district other than the Bay Area has actually finalized those risk assessments. But they have been submitted, they are going through the process, and the State has had a chance to review quite a few of those. And perhaps Melanie can elaborate on that if you like.

DR. MARTY: We've reviewed about 100 risk assessments, most of those from the Bay Area District. We're working on South Coast District and Ventura County District risk assessments as well as some from the smaller

areas in the north.

DR. FROINES: Then it goes back to whom?

DR. MARTY: Then we make comments to the district.

DR. FROINES: To the local areas.

DR. MARTY: Right.

DR. FROINES: Where does the public obtain, including this committee, obtain those documents? And when?

DR. MARTY: They are public dockets so that it is possible to go to the individual districts. And also we have had to allow access to environmental groups to come into OEHHA, into our files, and look at the documents. I'm not sure you'd want the total number or the whole document. We're expecting 730 from the 25 ton per year, and they range in size from 115 pages to 3 or 4 volumes.

MS. SHIROMA: At this point there isn't one specific repository for the risk assessments. But one of the things that we're looking at is whether or not the State can move towards having a repository for results of the risk assessment and then also to have access to the documentation. We aren't there yet. At this point it rests with each of the local air pollution control districts around the state, and there are 34. But we are looking at a longer term goal of having that repository for

the OEHHA.

DR. FROINES: I should say the point of the question is that there are things like refineries and other sources of butadiene that would inform this process.

MS. SHIROMA: Yes, and definitely during the control phase. Even if some of those risk assessments are still in process, the control staff could go in and start taking a look at that and try to fold that into their evaluation.

CHAIRMAN PITTS: Fine.

Would you introduce yourself for the court reporter.

DR. MARTY: Yes. My name is Melanie Marty, and I am with the Air Toxicology and Epidemiology Section, pinch-hitting for George Alexeeff.

Let's go back and look at butadiene. The members have already reviewed the document, and there was an SRP meeting on butadiene as you know, and Dr. Joe Brown, sitting to my left, gave the presentation. Members of the Panel had some questions which we have answered with the suggested changes that you have all received. In addition, we have talked to individual members of the Panel to see if our answers answered the question.

The proposed changes were sent to everybody, and hopefully everybody has had a chance to review them.

Our proposed range of risk then, just for a final cap on the discussion, is 9.8 times 10 to the minus 6 per part per billion to 8 times 10 to the minus 4 per part per billion. And that estimate, that range, represents from the rat data to the mouse I data all tumors. The best estimate at present is 3.7 times 10 to the minus 4 per part per billion, and that is from the mouse inhalation II study.

If members of the Panel have other items they wish to discuss regarding Section B or Part B, now is the time. We have Joe Brown will probably be able to answer most of the questions. And also to my right is David Holtzman who has also worked on the document.

CHAIRMAN PITTS: Thank you.

DR. WITSCHI: I have a question. I talked to George, and George said that IARC is probably in all likelihood going to endorse the upgrading of butadiene so to speak. What I was wondering, do we have any knowledge about their reasoning, why they changed their conclusions?

DR. MARTY: I think we probably have a copy of some of their reasoning. I don't have it with me.

DR. BROWN: What I saw was a very brief report on a draft report, but it didn't go into great detail on the reasoning.

DR. WITSCHI: So you wouldn't know what made them change their mind?

DR. BROWN: I imagine it's based on some of the newer epidemiology studies that are available that are discussed in our responses to your comments of the last time. But I don't have a copy of it with me.

DR. WITSCHI: Well, you have two more epidemiology in here, one is the Divine and the other one is the Matanoski. But the Matanoski, that's the same people which have been around for a long time.

DR. BROWN: Yes, yes.

DR. WITSCHI: I mean, so that's something --

DR. BROWN: We have the same situation with arsenic where there are multiple studies on the same population in Taiwan. So that's something that happens.

What we don't have, we don't have their final report. We've received indications that they are going to adopt this change, but until it's finalized and we actually get the final report.

DR. FRIEDMAN: That draft, wouldn't that give the reasons?

DR. MARTY: Yes, it does. But unfortunately they haven't used a whole lot of citation. It is from Dr. Veineo to Dr. John Rosenbaum in OEHHA. I could read this to you if that would help answer any questions.

Under the section where they discuss human carcinogenicity data:

"One U.S. cohort study of workers who manufactured 1,3-butadiene monomers showed a significant excess risk for lymphosarcoma and reticulosarcoma. Although there was no overall excess risk for leukemia, there was a suggested increase in risk in a sub-group of workers with non-routine exposure to 1,3-butadiene.

"In a U.S. study of workers employed in two styrene-butadiene rubber plants, there was a suggested increase of risk for leukemia with exposure to 1,3-butadiene in one of the plants. No increase in risk was seen for cancers of the lymphatic and hematopoietic system other than the leukemia.

"In a study of styrene-butadiene rubber workers in eight plants in the U.S.A. and Canada, there was no overall increased risk for leukemia. However, a sub-group of production workers had a significantly increased risk. There was no apparent increased risk for other lymphatic system cancers overall, although a significant risk was seen for production workers.

"In a case control study nested within

this cohort of styrene-butadiene rubber workers, a large excess of leukemia was found which was associated with exposure to 1,3-butadiene and not to styrene. In a case control study in the rubber industry, a large excess of lymphatic and hematopoietic cancers, including lymphatic leukemia, was seen among workers employed in styrene-butadiene rubber production. One study therefore specifically related increased risks for leukemia to exposure to 1,3-butadiene and not to styrene.

"In other studies, the increased risks for leukemia and other lymphatic cancers occurred among workers whose exposure had been in the manufacture of 1,3-butadiene or styrene-butadiene rubber."

(Dr. Seiber arrived at the meeting.)

DR. MARTY: It sounds like that they have reviewed studies that have already been reviewed, and it would be interesting to know if there was more follow up.

DR. WITSCHI: But you have no explanation why they changed their mind?

DR. MARTY: No, that's right.

DR. FRIEDMAN: Well, if you keep reading they usually tell the reasons why they arrived at the present --

they don't tell you why they changed their mind but they tell you why they arrived at the present conclusion.

DR. MARTY: Yes, usually they do. It goes through the animal carcino data, other relevant data, then it jumps to evaluation. "There is limited evidence for the carcinogenicity in humans of 1,3-butadiene." And then, "Overall, 1,3-butadiene is probably carcinogenic to humans, Group 2-A."

DR. BROWN: There's no critical analysis, it just jumps to conclusion.

DR. WITSCHI: Well, wait a minute.

DR. FRIEDMAN: I'll bet you if you read --

DR. WITSCHI: 2-A, that's not an IARC classification. What document are you reading?

DR. BROWN: Limited evidence is what they say.

DR. MARTY: Yes.

DR. WITSCHI: Yes, but what you were just reading, it's a 2-A, that's not an IARC classification, is it?

CHAIRMAN PITTS: 2-A, and possible is 2-B, right?

DR. WITSCHI: Okay, then I was wrong.

CHAIRMAN PITTS: 2-A is probable and 2-B is possible; isn't that right?

DR. FRIEDMAN: If you read the previous one it

probably would not have included some of the more recent epidemiological studies that sort of pointed specifically at the butadiene.

DR. WITSCHI: Probably, yes.

DR. FROINES: I assume it's a nested case control study.

DR. MARTY: I'm wondering if one of the changes was that styrene was considered a confounder, and this one little paragraph here seems to indicate that they do not consider that as being relevant to the leukemia.

CHAIRMAN PITTS: Yes, Dr. Friedman.

DR. FRIEDMAN: I was pleased at the changes, and I appreciate the fact that you took into account my comment about Phil Cole's combination of data. But I had one concern about a sentence that appears on page 2-D3. It's in the third paragraph. "OEHHA staff do not ordinarily aggregate data from different epidemiologic studies and draw conclusions." And the next sentence was what bothered me. "Mixing studies that observed associations between disease and exposure with studies that did not observe such associations will inevitably dilute the observed associations."

That's true, but it sounds like you're saying we only want to believe the positive associations, and something that dilutes it is wrong. I think there are good

reasons for not combining the studies, and I'm sure you know them, questions of comparable methodology and how you weight the different studies and so on. But to me that is not a good reason for not mixing studies, the fact that you may dilute an association. Maybe the truth is the absence of association and you're diluting that truth by combining it with a positive association.

DR. BROWN: Well, that needs to be rephrased I think.

DR. MARTY: Okay.

DR. GLANTZ: Why not just delete the sentence?

DR. BROWN: Just delete it.

DR. FRIEDMAN: Well, you may want to give some reason.

DR. GLANTZ: That concerned me too.

DR. BROWN: Yes, it sounds biased.

DR. GLANTZ: I mean, are you saying that you ignore studies that aren't positive? I mean, that's what it seems to be saying.

DR. FRIEDMAN: Yes.

DR. GLANTZ: I mean, is that what you operationally do?

DR. FRIEDMAN: I'm sure they don't.

DR. MARTY: No.

DR. GLANTZ: Okay. Well, then you should

delete the sentence because it sounds like you did. I was a little surprised when I read that too.

DR. FRIEDMAN: But you may want to give the reasons why you don't. I mean, here's an authority who did combine data and who may have good reasons for not wanting to do that, and I think that's reasonable to put them there.

MR. HOLTZMAN: Well, as we said in our response to your comment, Dr. Cole really did not present any detailed calculations or reasons for combining the studies, and I think perhaps that sentence was put in there to try and get at his motivation for doing so. He was in this instance a paid consultant for an industry group.

DR. FROINES: Well, I think that the one point is that that comment sounds like policy rather than science, and I think you want to give scientific explanations and not policy explanation in that.

And the fact that he was paid by industry is sort of irrelevant it seems to me because he's a very fine epidemiologist and is well respected. And I think that comment doesn't serve any useful purpose.

MR. HOLTZMAN: Sure.

DR. FROINES: But I think that talking about the limitations of combining studies is a matter of science.

DR. MARTY: Okay, yes, that makes sense.

MR. HOLTZMAN: We can do that.

With all due respect, Dr. Froines, the issue of whether his testimony was scientific and peer reviewed was discussed here at the last meeting, I was just picking up on that.

DR. FRIEDMAN: I don't like the implication either that because someone is a paid consultant that that makes them automatically biased.

MR. HOLTZMAN: I apologize for that statement.

DR. MARTY: I agree too, I've been a paid consultant before.

Okay, Dr. Friedman, did you have any more comment?

DR. FRIEDMAN: No, I was just concerned with that one sentence.

DR. MARTY: Okay.

DR. FRIEDMAN: But, again, I appreciate all the work you did in responding to my previous comments.

DR. BECKER: I just wanted to ask, were there studies done about, it says limited indoor monitoring. In smoking environments were there actual studies done of 1,3-butadiene? And we asked that question before because the risks are so much greater indoors than outdoors and by

many orders of magnitude. And then I lost somewhere in there what was happening with that. You said that there was some data for that that you knew about; is that correct?

DR. MARTY: I think I might turn that over to Genevieve.

Genevieve, did you all look at that?

MS. SHIROMA: Dr. Becker, are you asking about exposure studies?

DR. BECKER: Right.

DR. MARTY: Right.

MS. SHIROMA: Dr. Becker, are you referring to exposure studies --

DR. BECKER: Yes.

MS. SHIROMA: -- of 1,3-butadiene? Okay, my understanding, and Joan and Kelly can edify if necessary, is that there have not been specific studies to quantify the 1,3-butadiene fraction of ETS. We know that 1,3-butadiene is a component of ETS, and there have been studies on ETS indoors. We weren't able to quantify that portion, unlike formaldehyde.

DR. BECKER: Well, that was exactly the point. On the tentative findings, No. 9, it said limited indoor monitoring, and it lists 10 to 60 micrograms.

MS. SHIROMA: And again, Kelly or Joan can

clarify if necessary, but my understanding is that it's a rough extrapolation.

DR. BECKER: So that's an estimate?

MS. SHIROMA: Yes, that's right.

DR. BECKER: I see. That was one of the questions that we asked about before because this is obviously the largest source. It seemed to me that that was where you'd want to make the monitoring measurements because that poses such a greater risk to people.

MS. SHIROMA: And our research division is following up on additional indoor studies.

And, Joan, do you know if they've included 1,3-butadiene for those future studies?

MS. DENTON: Yes, they have.

MS. SHIROMA: Okay, the answer is yes.

DR. BECKER: It seems to me that in terms of what we communicate -- and the lead person, I guess it's Dr. Witschi, isn't it?

CHAIRMAN PITTS: For which? Part B or A?

DR. BECKER: For B.

I mean, it seems to me that they're going to ask you about that I would imagine because that's a much bigger source of potential exposure, indoor, so they may ask about that. And that's why I think that that No. 9, probably those are many orders of magnitude greater

exposure.

MS. SHIROMA: Right. And Dr. Glantz had brought up that issue at the last meeting, and we had a conference call with Peggy Jenkins, our indoor air expert, and Dr. Glantz. And realizing that it's important, it will be studied further because it does look to be important. But at this point we don't have that quantitative data.

DR. BECKER: Okay.

CHAIRMAN PITTS: While you're on this subject, there's one point here. On the Executive Summary there was a change made in line with this. "On page 4," this is the first page of what we have here submitted to us, Executive Summary, "in response to the question, 'What about indoor exposure to 1,3-butadiene?', the lead sentence has been changed from 'Indoor air may be the major route of exposure...' to 'Indoor air is almost certainly the major route of exposure to 1,3-butadiene for individuals exposed to a heavy smoking environment.'" That's a good statement.

DR. GLANTZ: My only concern there and also there's a couple places where they say heavy smoking environment, and I would like to see the word "heavy" taken out throughout because it's just an environment where the smoke is present. I mean, you don't have to be in a bingo hall in order to get high doses compared to outdoor doses.

MS. SHIROMA: Yes, I think we can go ahead and

remove that.

DR. GLANTZ: There's several places through the document.

CHAIRMAN PITTS: Could I continue with the point you've made here, and I think this is a point that we made at the last meeting also. If we look at the risks, this table of unit risks, of all the compounds that we looked at it seems to head the list for gaseous, gas-phased species. That's point one, okay.

Two, I must have an old list, you will change the numbers? Will these numbers be changed then, the risks? Be sure we change them on this material that was handed to us.

MS. SHIROMA: Right.

CHAIRMAN PITTS: Okay, be sure of that. And that will be changed in the Executive Summary; is that correct?

MS. SHIROMA: Yes.

CHAIRMAN PITTS: Okay.

Now, we did raise the question if in fact we have something that has a risk -- and we'll put the error bars on the risk, that's fine -- that is that prevalent and that pervasive in the atmosphere, the Panel raised the question as to what steps are being taken to make more definitive measurements, quantitative definitive

measurements in the case of butadiene so that instead of being very general and they're qualitative, we can come up with an exposure assessment which will be somewhat equivalent to what has been done for formaldehyde which is another bad actor and in which some really first-class work has been done in establishing the concentrations one finds in mobile homes, typical homes, and so forth.

My simple question is what is being done in this area of setting up a research program, carrying it out, and putting it on a high priority for a compound that's clearly -- if this is all correct would you agree that it belongs at the top of the list? Would the medical people agree from the OEHHA?

MS. SHIROMA: Yes.

CHAIRMAN PITTS: And what's being done to do this, and not just that will be supplementing -- complementing actually, complementing the ETS work that we've been talking about?

MS. SHIROMA: Dr. Pitts, two things. First of all as Joan confirmed for me, Peggy Jenkins' group in the indoor section of the research division is pursuing additional research studies to quantify the exposure indoor. I can't tell you what the dollar amount is of those studies, but I know that they are pursuing those, and we should be able to start seeing some analysis from that.

So additional data is being pursued.

Now, in the meantime as I'm sure you're aware, we are always having to keep in mind as well that the Air Resources Board does not have indoor air authority in terms of risk management or control. 1807 does require us to address indoor air in our reports to you and then to the Board, so we are weighing very carefully the need to include that discussion, to get the data that's necessary for that to pursue it further if it looks to be an important actor.

But we're also keeping in mind too in the grand scheme of prioritization of our resources and work, what else can we do? At this point we don't have that indoor air authority. But that's not to say that we aren't pursuing this, and in fact the research dollars are going to be placed towards getting that quantitative data for the butadiene.

CHAIRMAN PITTS: Dr. Glantz.

DR. GLANTZ: Yes. I had a long talk with Genevieve and Peggy Jenkins and some other people about just this issue because as you'll recall from the last meeting, I pressed them to come up with more specific risk numbers for indoor butadiene than the report has. I mean, it's got more than it did before, but it didn't go as far as I was asking last time.

And basically the argument that was made to me which I think was a strong argument was that most of the butadiene almost certainly comes from ETS. And ETS is pretty well characterized, and in fact -- indoors -- and easier to characterize than its individual constituents, and that it's hard to just say just because you have a certain amount of ETS you have a certain amount of butadiene, or formaldehyde or polycyclic aromatic hydrocarbons or whatever because it depends a lot on the ageing and the specific physics of the situation.

And they argued that they thought resources would be better put into looking at ETS as a mixture rather than trying to pull out the separate compounds. And since they are now moving ahead with looking at ETS, I actually think that they are right, that it's simpler and in the long run probably better to just deal with ETS as a whole rather than getting too concerned about the specific sub-constituents because the behavior of those constituents can be quite different, depending on the temperature and the air movement patterns and that.

Now, that's not to say that this specific compound isn't worth looking at too. But I think that they're better off in an era of limited resources putting it into looking at ETS as a generic thing rather than trying to pull out how much butadiene there is from ETS.

They know there's a lot, they know that represents a major, if not the major route of exposure for most people, and the document now says that I think pretty clearly.

And so I was mollified on that point. And I think basically the direction they're moving is a reasonable one from a scientific point of view too.

MS. SHIROMA: Also, Dr. Pitts, in talking about the outdoor concentrations and risk, as you are aware the emissions are largely from motor vehicle exhaust and are some cold start emissions, and so the current control program is taking a hard look at that cold start accent.

CHAIRMAN PITTS: I understand that, and the reformulated fuels, you have a comment on reformulated gasoline.

I guess I have a question then of Dr. Glantz. How does one determine in a chemical sense what measurements are made to determine exposure from the Part A perspective to ETS? Do you measure particles, do you measure gases, do you measure total hydrocarbons, total organics, or what are the measurements made?

DR. GLANTZ: Yes.

CHAIRMAN PITTS: But you don't speciate them? You just say --

DR. GLANTZ: No, no, at least people haven't done that so far. Typically people will look at RSPs, at

total particulates, at nicotine because that's very specific to tobacco, and carbon monoxide, although that can come from a lot of different places. And we in some of the research we've been doing in chamber exposure studies have been looking at polycyclic aromatic hydrocarbons.

DR. FRIEDMAN: What are RSPs?

DR. GLANTZ: Respirable suspended particulates, small particles. And also total particulates which actually are turning out -- we've been looking at that too in these exposure chambers. And there's new technologies that make it easier to measure total particulates, and it turns out about a third of the total is RSPs, which the RSPs appear to be the important ones.

But these things all co-vary. And if you basically -- while it's hard to break out exactly what the different constituents are doing, they all tend when you stand back and look at it over orders of magnitude, they all co-vary together pretty well. So it doesn't matter too much what you measure as long as it's something that isn't confounded with a bunch of other variables.

So I don't think for example when they come to us with the ETS report, I'm not -- I mean, if they come back and say, here's how much formaldehyde we're detecting and how much butadiene and how much of this and how much of that, I mean, that would be okay. But I think what you

really want is some overall measure of exposure, and that's what most people have done.

Now, there have been some things looking at specific components, but there's three or 4,000 different things in tobacco smoke, so it's hard to look at all of them.

CHAIRMAN PITTS: Well, we generally agree on a number of issues, but I think I beg to -- well, I have a concern, I have a concern about effectiveness. I think if one can take a number, specific numbers versus the overall, and have a number of 10 to the minus 4 say, something like that or close to 10 to the minus 3 -- one of your numbers was almost 10 to the minus 3. Wasn't one of the new ones 9 times 10 to the minus 4 or something that you gave us?

DR. MARTY: Yes.

CHAIRMAN PITTS: Isn't that right? I mean, it was close to 10 to the minus 3.

DR. MARTY: It was the upper end of the range.

CHAIRMAN PITTS: Yes, the upper end was what?

DR. MARTY: 8 times 10 to the minus 4.

CHAIRMAN PITTS: Okay, that's heavy duty. And I think frankly for your strategy for the idea of defending ETS, it seems to me that you might from what I've seen of PAHs and non-substituted and so on, you might have a very much stronger case actually if you turned the argument

around and said, we have the measurements of butadiene. Here is a number of 10 to the minus 3. You're in the ball game of the really heavy duty. And we can get numbers, butadiene can be measured. It's a little tricky, it's unsaturate, conjugate unsaturate and it's tricky. But I have the feeling that we can.

Now, also in terms of the ARB's mandates, formaldehyde, another constituent, has been measured indoor. The work that Peggy Jenkins and her crew has done I think is exemplary, I am just really impressed by that. On an international basis I have been sending out that material worldwide. People are really concerned. The numbers are there. And I think that on the one hand you may have a fight, we will have a big fight on ETS, and I want to continue to do it. But to pick out one actor like this that's this tough and really go for that would greatly strengthen the case in my opinion. So I just put that on from my perspective. But we can talk about it.

DR. BECKER: But I think the document more accurately reflects now, and also the document with the changes describing the epidemiology now, a more fair balance about exactly what it shows because it's more descriptive. I guess I share the same feeling that others have about if the IARC was going to change it we really ought to know why. Because they probably got the same data

that we have, and we had the same questions, so it's a little puzzling why they would do that. Because don't they have very rigorous rules and regulations about how they decide what goes into the 2-A or 2-B?

DR. FRIEDMAN: Well, no, I think if you would read the previous report, their previous conclusion, you probably would find that there weren't the same studies that were just cited now.

DR. BECKER: I see. Because they did upgrade, I notice that they have added these references, this 1990 and so forth. They don't seem to add enough weight to change that from what I can see.

CHAIRMAN PITTS: Well, I agree, it's a great improvement, what's come into this. And I'm thinking more of the future, for the next round down the pike.

Okay, now let's continue.

DR. MARTY: Could I just make --

CHAIRMAN PITTS: Yes, by all means.

DR. MARTY: We could, for Dr. Becker and Dr. Friedman, follow up with IARC, talk to a few people there.

CHAIRMAN PITTS: Would you do that. Would you communicate and say that the Panel were concerned.

DR. MARTY: Sure.

DR. BECKER: I think because too that one of

the things that's a little confusing to me about the way it currently reads is it says we anticipate that IARC will be doing this. On the other hand if you said, "Because A, B, C, and D, IARC is doing this in light of that," then that would make it better.

DR. MARTY: I agree.

DR. BECKER: Because one of the things actually in going back over some of the documents in the past, this one looks like it's a little different in that there seem to be some things in motion. And I think it would be worthwhile saying, "Based upon communications with them that this has changed because..." I think that would help, become clearer.

DR. MARTY: Okay.

CHAIRMAN PITTS: Are there other comments?

(No response)

CHAIRMAN PITTS: Well, then I guess the next step is to consider the findings.

Now, I find that somewhere in this pile of material I must have some findings.

MS. SHIROMA: Yes. In fact, they're at the back of the -- we added one more copy.

CHAIRMAN PITTS: Did those findings reflect the latest numbers that we were just given for these unit risks?

MS. SHIROMA: Yes, they do. And I notice that we'll need to change to parts per billion.

CHAIRMAN PITTS: Great, okay.

MS. SHIROMA: It's the last four pages of the material.

CHAIRMAN PITTS: Dr. Becker, Item 1 was what you were pointing out, that's exactly what you were referring to, yes. And you're quite right, we should have some backup for the statement, "It is our understanding that.." Right?

DR. BECKER: Right. So I would just say, based upon whatever it was, IARC has made that change. It isn't clear to me from what you stated why they've done that. I also talked to George about that, and he wasn't sure either. He talked to me yesterday because I had that same question when he called.

MS. SHIROMA: So what we can do then is OEHHA can follow up with IARC to get to the bottom of the reasons as to the proposed change and incorporate that language, maybe talk to you, to Dr. Witschi, and Dr. Friedman, incorporate that into the findings for finalizing.

CHAIRMAN PITTS: That would be fine. That's good, excellent.

DR. BECKER: Well, I think if Dr. Witschi is going to present it, I'm interested in it, but I think it

would be important to make sure that he understands.

MS. SHIROMA: Absolutely, yes.

MS. DENTON: So, Dr. Pitts, we could say, "However, based on," then whatever the evidence is, "it is our understanding..."

MS. SHIROMA: And we'll run the language by Dr. Witschi.

CHAIRMAN PITTS: That's right, exactly, that's the way it should be.

MS. DENTON: Okay.

CHAIRMAN PITTS: On 4, I'm again back, would you change those units and keep everything consecutive?

MS. SHIROMA: My apologies, yes. Parts per billion, right.

CHAIRMAN PITTS: Because I have to sign this as Chair, and if I've forgotten that one I'm in trouble which might suggest that you might be.

MS. SHIROMA: Yes, I understand.

CHAIRMAN PITTS: That's the way it goes, you know. Okay, let's do that for sure.

MS. SHIROMA: Okay.

CHAIRMAN PITTS: And then we want to maybe agree too in the future that when it comes over you'll have them translated and we'll get together, and all in the same units, consistently.

MS. SHIROMA: A little extra coordination between ourselves for consistency, yes.

CHAIRMAN PITTS: No, I understand, because you may be using it in ppm, I understand completely how that could work.

DR. FRIEDMAN: Jim.

CHAIRMAN PITTS: Yes.

DR. FRIEDMAN: A question about point 4. I just wonder in the last line, "the actual risk may be significantly lower" whether there might be any confusion caused by the use of the word "significantly." You know, people often interpret that as statistically. I wonder if you might want to substitute a word like "substantially" or something like that.

DR. GLANTZ: Much.

DR. MARTY: We've used "much" in other documents.

MS. SHIROMA: If the Panel is comfortable with that, we'll change that word then.

CHAIRMAN PITTS: That's a good point.

MS. SHIROMA: "May be much lower."

CHAIRMAN PITTS: We're just taking a pause to go through this again, the findings for sure now.

DR. WITSCHI: I have a question for Finding 9, and I assume this refers to passive smokers. And do we

just forget about those poor souls who are still actively smoking?

MS. SHIROMA: This is environmental tobacco, so it's passive.

DR. GLANTZ: Yes, you might want to clarify that because I'm sure people, the active smokers are getting a very heavy dose too, much heavier. But that we've never considered.

DR. WITSCHI: They're beyond salvation anyhow, right?

DR. GLANTZ: Yes. Well, I don't know if that's true, but anyway.

MS. SHIROMA: We could modify No. 9 to say that a --

DR. GLANTZ: Why don't you say individuals exposed to environmental tobacco smoke. "Limited monitoring for 1,3-butadiene indicates that individuals exposed to indoor environmental tobacco smoke are almost certainly exposed to higher concentrations indoors than outdoors. The estimated dose for an individual spending three hours exposed to ETS is..."

MS. SHIROMA: Okay, duly noted.

DR. GLANTZ: You know, one thing I didn't do, how does that 10 to 60 micrograms compare to --

DR. WITSCHI: I had a question on that one on

the dose. You know, in all the other ones we refer to not strictly a dose but ambient concentrations of butadiene. And those 10 to 60 micrograms, wouldn't it be better to replace it with some atmosphere that they might be exposed to?

DR. BECKER: See, that was the question I asked earlier, that that's an extrapolated number that comes from what they know about ETS and its percentages, they don't know that. That was the whole basis for me raising that question because that number is so different when you talk about micrograms, and it sort of sits there, and then they're going to ask you, well, what's the meaning of that and how does that translate?

And that's why I was responding by saying, well, that's a much larger dose by comparison. I mean, when you're talking about the numbers that we're listing there of 10 to the minus 4 or 5 and you're talking about micrograms and whatnot, that's a lot of stuff.

DR. GLANTZ: If somebody spent three hours sitting outdoors breathing -- what was it?

CHAIRMAN PITTS: 0.37 ppb.

MS. SHIROMA: Or 0.82 micrograms per meter cubed.

DR. GLANTZ: Yes. Okay, if the same person was sitting outside just breathing for three hours, what

would their dose be?

DR. WITSCHI: Well, that's a good question, but why not go the other way around and come up with some number what the butadiene concentration in a smoke-rich indoor environment might be.

DR. GLANTZ: Well, that too. Yes, I --

MS. SHIROMA: Perhaps --

DR. GLANTZ: Go ahead.

MS. SHIROMA: I'm sorry to interrupt. In thinking back to our discussions with Peggy Jenkins on this, I know that she was reluctant to go further because when you do put down an exposure rate it has a certain connotation that it's a quantitative connotation. I think she felt that the data really falls short of that, and that's why she suggests to you that you use this statement: individuals spending three hours is 10 to 60.

DR. GLANTZ: Okay, okay. What we're saying though is that that needs to be compared to something in the same units.

MS. SHIROMA: Oh, okay, I see.

DR. GLANTZ: So if you took your outside exposure with average breathing rates for three hours and all that, what would that dose be? I mean, can you do that calculation?

MS. SHIROMA: We can do that calculation. And

so what you're saying is we would say then, this compares with an individual spending three hours in an outdoor atmosphere, breathing in X amount of micrograms.

CHAIRMAN PITTS: Or the average, 0.37, which is the number you've taken in ppb.

DR. BECKER: If you multiply the numbers -- it's going to be huge.

MS. SHIROMA: Here's the difference.

DR. MARTY: I get 0.0004 micrograms.

DR. BECKER: Right, that's what I'm saying. That's why I said the number, when I read that, of 60 micrograms was an unbelievable dose for comparison purposes.

DR. GLANTZ: Well, then you should just maybe add that, to say this compares with 0.000000.

MS. SHIROMA: Okay.

DR. SEIBER: I don't think the number is that low. I just did it in my head, and it's more like one to two micrograms.

DR. MARTY: Oh, I'm looking at the wrong thing, never mind. I was multiplying by the wrong number.

MS. SHIROMA: We'll double check the calculation. But if the Panel wants that statement in there as a comparison, we'll put it in there.

CHAIRMAN PITTS: Absolutely.

DR. GLANTZ: Here is the sentence you could add. You could say, "The same individual spending three hours outdoors breathing the average ambient concentration of 1,3-butadiene would receive" --

CHAIRMAN PITTS: Of 0.36.

DR. GLANTZ: "of 0.36 ppb would receive an estimated dose of somewhere between 1 and 0.0000."

DR. FROINES: I think this is an extremely important issue because when you get around to nested case control studies and you're dealing with small populations, your controls might happen to be in houses where smokers are maybe getting a greater exposure, non-smokers may have a significantly greater exposure than people in the ambient environment. And so they will be classified as non-smokers for the purposes of epidemiology which will have a profound affect presumably on: they're not really non-smokers; they're really smokers who smoke a little less than smokers. And we don't take that into consideration when we do epidemiology for the most part.

DR. MARTY: That's right.

DR. FRIEDMAN: I'm sorry, I don't quite follow what you're saying. Are you talking about case control studies of the industrial pollutant or smoking or what? I'm just not clear on what you're talking about.

DR. FROINES: I'm simply saying that if you

have a significant exposure to environmental tobacco smoke and are classified as a non-smoker, the risk may be different than a person who doesn't have that environmental tobacco smoke exposure.

DR. FRIEDMAN: I can't argue with that.

DR. FROINES: But how we deal with controls with people who are non-smokers, we always assume that they have no exposure to tobacco smoke.

DR. FRIEDMAN: Right. I think more and more nowadays people are trying to measure passive exposure and throwing that into studies whenever possible.

DR. GLANTZ: Yes, I mean, there are a few studies where people have looked at what you call a true non-smoker like the Mormons in Utah or Seventh Day Adventists. And you end up, for example, when you use those people you find your risks of smoking-induced diseases among true smokers go way up because the passive smokers contaminate the control group.

I actually thought you were saying something a little different which is also important, and that is that when you're doing studies of these environmental toxins, you know, let's say you wanted to do an environmental study of 1,3-butadiene. If people were passive smokers, the secondhand smoker exposure can be swamping out the effects of any industrial exposures too or ambient exposures, so

that's another problem.

DR. FROINES: Well, that's something that you would like to study.

DR. GLANTZ: Oh, okay.

MS. SHIROMA: Okay, we can add that sentence, and we'll double check the calculation.

DR. SEIBER: I had a question, Jim, about No. 10. I can't remember the wording in the original letter that we looked at last meeting, but I think the word "rats" appeared in there, and I just wondered what happened to the rat information. We did agree to change and partition out the rats from the mice, but I see the rat information is not there, or else I've overlooked it.

MS. DENTON: We're checking, we're trying to find the original finding.

DR. BECKER: It says in finding 4 that it was related to rats and mice.

DR. BYUS: Well, I have the original findings here. It looks like it said animals originally, now it says mice, which is probably more accurate.

DR. SEIBER: It just seems to me a vague recollection that rats were much less sensitive than mice, that there were data with rats. Maybe somebody can correct me if I'm wrong.

DR. MARTY: No, that's correct.

DR. SEIBER: So I guess my question then would be should that less sensitive animal model at least be cited to give completeness to the document?

DR. WITSCHI: I have also a question on 10. Do we want to keep the last two lines that butadiene is only one of two chemicals that cause tumors in the heart? Because really, we do not use this information, as a matter of fact we don't know how to use this information in the overall risk assessment, and if the sentence is there, all it might do is strike additional fear in the hearts.

I'm wondering whether this sentence is germane to the findings. I'm not disputing it, I'm just wondering whether it belongs in the findings.

DR. BECKER: What's the strength of it? I don't remember. How strong is that, do you remember the studies?

DR. WITSCHI: Oh, yes, it's very unusual. I mean, the statement is absolutely correct. And it's, well, what's the incidence of heart tumors, some 10, 15 percent I think.

DR. MARTY: It's high. Let me check.

DR. WITSCHI: It's quite high, it's quite remarkable.

DR. BYUS: I think it's a very unusual effect.

DR. WITSCHI: Yes, yes.

DR. BYUS: And I think it probably deserves to be in the findings, but this is at high doses --

DR. WITSCHI: See, but we don't use it.

DR. FRIEDMAN: You could add something, "Although not involved in the risk calculations, it is of interest to note that..."

DR. BYUS: Right.

DR. WITSCHI: Yes.

DR. FRIEDMAN: That would take some of the emotional aspect out of it.

I see what you're saying. You're saying, God, isn't that awful, it even caused tumors in the heart, and you want to get rid of that sort of emotional implication. Maybe a few words could do that.

MS. SHIROMA: Okay, so OEHHA can add some clarification on the context of that sentence.

CHAIRMAN PITTS: But leave it in.

MS. SHIROMA: Leave the information there, but clarify.

CHAIRMAN PITTS: That's fine.

On 13, now we're back to IARC again. On 13, to be consistent with what we said earlier, on 13 --

DR. MARTY: Pardon?

MS. SHIROMA: Number 13.

CHAIRMAN PITTS: I'm sorry.

DR. MARTY: I was just talking to Joe about the fact that the mouse tumors, that the hemangiosarcoma of the heart muscle is actually in the range of risk for the calculation.

CHAIRMAN PITTS: Okay.

And on 13, to be consistent with what we had up above, would you want to say that, again, add the qualification of IARC considerations making it now a probable. I mean, whatever qualifications you had earlier you would add instead of possible, because that just sort of says it bluntly and yet we've changed it up above in 1, okay?

MS. SHIROMA: Reflect the clarification on IARC in No. 13 as well?

DR. WITSCHI: Yes.

DR. GLANTZ: I think we could just say probable down here because we've already, I mean, we've already explained the No. 1 about IARC. We don't need to do it twice, just change the word.

DR. MARTY: Well, it's not finalized though, that's kind of tricky.

DR. GLANTZ: Well, how about saying, "Based on the evidence that it is an animal and probably probable."

DR. MARTY: And possibly a probable?

CHAIRMAN PITTS: And therefore it's probably

right.

MS. SHIROMA: Maybe a proposed probable by IARC, because that's basically what it is, it's a proposed probable.

DR. GLANTZ: Or you could say, any possible or probable human carcinogens.

CHAIRMAN PITTS: Yes, you could even put possible slash.

Just put a slash probable, possible/probable.

DR. GLANTZ: Or an "or."

CHAIRMAN PITTS: Then at least you're consistent.

MS. SHIROMA: Dr. Pitts, I just wanted to make sure that we addressed Dr. Seiber's comment about No. 10.

CHAIRMAN PITTS: About the rats?

MS. SHIROMA: Dr. Seiber, you mentioned about the rat information, and did we -- were you contemplating a separate finding or adding to this No. 10?

DR. SEIBER: Since I didn't have the last draft before me I can't remember what it said. But it occurred to me that rats were much less sensitive than mice, and I wondered if there should be a statement that it's also been identified as a carcinogen in rats but at a higher dose level, something just to make the database complete.

CHAIRMAN PITTS: I think that's a good point, because I do remember we did have a considerable discussion about mice and men with Steinbeck and then rats.

DR. SEIBER: I knew you'd remember that.

CHAIRMAN PITTS: Yes, I remember that.

Could we do that then, that's a good point, if there's no objection.

MS. SHIROMA: Yes.

DR. FROINES: Can I make one comment about 13. It has to do with the notion of probable versus possible. My understanding of EPA, and I admit it's somewhat vague, is that if EPA labels something possible as opposed to probable that may impact their decision about doing risk assessments on the compound, that is that the naming of possible and probable has implications with respect to EPA's activities.

When it comes to us, since by our naming it as a toxic air contaminant it is by definition, there is a risk assessment which is done and a regulatory process is going to follow, so that the issue of possible versus probable has no weight. Whereas with EPA is does have some weight, however they choose to deal with it.

So it seems to me that we should be aware that the name that we choose to say should be what we choose to say because we already have done the risk assessment and it

is going to be regulated. So the term we choose should reflect our scientific understanding and the State's scientific understanding of the issue, it seems to me.

DR. GLANTZ: So which word are you proposing?

DR. FROINES: I'm not. I don't think it really matters very much. I guess it matters if people are going to sue you and you said possible versus probable. But I don't think anybody is going to do that, so I don't think it really makes a difference.

It seems to me if we think it's probable we should say that, if we think it's possible, or if we think it's probable/possible. I was just trying to raise the point that there is a difference between what we do and what EPA does, and so we shouldn't necessarily see ourselves bound by any of those terms.

CHAIRMAN PITTS: Well, one way to address this would be to ask OEHHA what would you people say is the term? We're evaluating your conclusions, and so let's hear your conclusion.

DR. MARTY: I'm probably sticking my foot in my mouth, but I think that most of the staff scientists that have looked at it would say it was probable. The only concern I have is we don't have an official State of California weight of evidence classification. And this could be confusing in that people will look at that and

then go back and look at EPA and IARC and say, that's not what it currently is, even though IARC is most probably going to change it to probable.

DR. GLANTZ: But as John said, we're making our own judgment. We've already said earlier on what IARC and EPA said.

MS. SHIROMA: I'm wondering if you can leave the language --

CHAIRMAN PITTS: Just leave it. Well, why don't we just declare it a toxic air contaminant as you have indicated.

Stan, we discussed probable/possible in the first item of these findings, and it clearly says with the modification that IARC is now going to --

DR. GLANTZ: Yes, why not just say, "Based on the available evidence indicating that 1,3-butadiene is an animal and human carcinogen..."

CHAIRMAN PITTS: Well, or just, "Based on available scientific evidence, we conclude that 1,3-butadiene ..." I would rather say that.

DR. GLANTZ: That's even better.

CHAIRMAN PITTS: "Based on available scientific evidence, we conclude that 1,3-butadiene should be identified as a toxic contaminant."

DR. GLANTZ: Yes, that's better.

CHAIRMAN PITTS: That fits within the mission and the purview of our --

DR. GLANTZ: I move that we do that. I think that's a good idea.

MS. SHIROMA: "Based on available scientific evidence, we conclude that 1,3-butadiene should be identified as a toxic air contaminant."

DR. GLANTZ: Right.

CHAIRMAN PITTS: Inserting the bottom line.

Is that agreed?

Are there other questions?

DR. BECKER: I make a motion that we accept the findings as modified.

DR. GLANTZ: Second.

CHAIRMAN PITTS: Any further discussion?

(No response)

CHAIRMAN PITTS: All those in favor?

(All ayes)

CHAIRMAN PITTS: Opposed?

(No response)

CHAIRMAN PITTS: It's unanimous.

DR. GLANTZ: Do we also need to make a motion that the report isn't seriously deficient?

MS. SHIROMA: Well, the statutes do say that you need to find that the report is not seriously

deficient, and then adopt your findings.

DR. GLANTZ: Okay, I move that we find that the report is not seriously deficient.

DR. FRIEDMAN: Second.

CHAIRMAN PITTS: Any further discussion on that point?

(No response)

CHAIRMAN PITTS: All those in favor say "aye."

(All ayes)

CHAIRMAN PITTS: Opposed?

(No response)

CHAIRMAN PITTS: And if anyone asks us why did we use the negative, not seriously deficient instead of saying, good show, good stuff, I think the response would be in the law it says that. That's why we're saying that. So if anyone ever asks you why do we use convoluted technologies if it's okay, it's the law. Right?

MS. SHIROMA: Right.

CHAIRMAN PITTS: And I think that, maybe I could speak for the Panel, I think we appreciate very much what all of you have done, put forth, the efforts of the staff on both sides, OEHHA and the ARB, the additional time and energies involved on your part to produce it, to come back for a second round, and to make these changes. We appreciate that because it improved the document, and good

show.

MS. SHIROMA: We thank you very much.

DR. FROINES: May I make just one comment about that. Since I presented formaldehyde last Thursday and it went through, the one thing I thought that the ARB actually liked and felt very positively disposed was the fact that we held two meetings on a compound, and that they felt that it added depth to the discussion and really said that -- I don't know if they said it explicitly, we'd have to look at the transcript -- but it was clear that they thought that that was a good thing for this Panel to have done.

Is that fair, Bill?

CHAIRMAN PITTS: That's an important comment, and I appreciate that in the context. I would also like, while you've made the comment, would you like to since you hit the perc, we have the formaldehyde, would you have any other comments about this meeting? You're looking well having survived that, and I think, you know, in terms of a risk assessment you've done very well on these.

You're up next, aren't you?

DR. FROINES: Yes, my comment was thank God somebody else is up next.

CHAIRMAN PITTS: That was my thought about it.

Would you want to make any comments about the

formaldehyde discussions, or did any of it need to be --

DR. FROINES: No, I thought the discussion went very, very well. I thought George Alexeeff did a superb job presenting the Health -- I thought that the presentations on both Parts A and B were quite good. I thought that the industry was very responsible, had good comments and questions. I just thought it actually went very, very well. It seemed to me to go very smoothly.

CHAIRMAN PITTS: Well, that's good to hear.

MS. SHIROMA: Okay, and 1,3-butadiene we anticipate will be heard at the July Board hearing, and we'll be working with Dr. Witschi in preparation for that.

CHAIRMAN PITTS: What day in July is this going to be held, do you know?

MS. SHIROMA: It's the second Thursday of the month. I'm not sure which day that is.

MS. DENTON: July 9th.

DR. FROINES: I do think there are some issues about formaldehyde that will come up as we discuss, not so much perchloroethylene but the various letters. And I think by the way the letter that Tom Davis wrote on this issue is absolutely extraordinary. And I hope the Board has a copy of it.

CHAIRMAN PITTS: Yes, the letter, you all received copies of the letter, it was classic, absolutely

classic. We appreciate that.

DR. GLANTZ: Does the Panel, I mean, I felt the same way. Would it be useful for the Panel to sort of go on record as stating that Dr. Davis was speaking for the way people feel here?

CHAIRMAN PITTS: Well said and exactly.

Would that be?

DR. BECKER: I think we should make a motion of that and support it.

CHAIRMAN PITTS: I would be delighted to hear such a motion.

DR. BECKER: So moved. I make a motion that we accept, endorse the letter and the spirit of the letter dated January 6, 1992.

DR. GLANTZ: And if I could add, that we direct the Chair to write a letter to the Board transmitting Dr. Davis's letter and pointing out that it represents the views not only of himself but the Panel.

DR. FRIEDMAN: Second.

CHAIRMAN PITTS: Any discussion?

(No response)

CHAIRMAN PITTS: All those in favor?

(All ayes)

CHAIRMAN PITTS: Opposed?

(No response)

CHAIRMAN PITTS: Then it's carried. It shall be done.

DR. FROINES: I think it's clear that the Board is going to be very interested in our participating in hearings that occur prior to the SRP receiving documents, that is workshops similar to that which have been held before which occurred during the document development phase, and not -- and I think I feel pretty strongly having sat through the perchloroethylene one that that's when the workshops should occur and should never happen when the document comes to us.

DR. GLANTZ: But isn't that the way it is now? I mean, I went to the one on nickel.

MS. SHIROMA: That's right.

DR. GLANTZ: I mean, I agree, I went to the one on nickel and I found that very, very useful. But that's the new procedure, right? That's held before the document is written.

MS. SHIROMA: That's right. And so for example, this summer we plan on holding a series of workshops on the compounds in progress now before they come before the SRP.

CHAIRMAN PITTS: We had had a workshop on formaldehyde ahead of time too.

MS. SHIROMA: Yes, we did.

CHAIRMAN PITTS: I recall you and I were involved with that, yes.

But that is, for the record, it is a commitment that we will have these before. As Professor Froines has indicated, it's really important to do that.

MS. SHIROMA: An absolute commitment.

CHAIRMAN PITTS: And then another, as long as we're on this subject and we're discussing this procedure, we also want to be sure as I recall that we receive the comments that have come in from the comments, Part Cs, and the revisions well ahead of our Panel meetings.

MS. SHIROMA: Right, to give you, the Panel, the maximum amount of time to adjust the comments.

CHAIRMAN PITTS: Yes, absolutely. It's really important. We have very, very busy and very involved people who are very concerned about the Panel, this is all the way around. They take it very seriously, I'm impressed with the Panel's performing their functions. So they want to do it seriously and well, and it requires then real time.

We should err, if we're going to err, let's err by deferring the meeting date if we have to rather than receiving a package and in a very short period of time evaluate these.

DR. FROINES: I think it's really important

though, going back to the workshop issue, the one thing I didn't say and I think everybody, I think everybody knows it, is that the industry people really would like members of the SRP to participate and be active in workshops. So I think that's part of what I'm saying, it's not just that they have them, but that we, some of us attend.

MS. SHIROMA: And that's also part of our new current system that we would arrange it so that it's a convenient time for both leads, Part A and Part B, to be able to attend these workshops as well. So, those of you who have compounds coming up, we'll be talking to you about dates and times for the workshops this summer.

DR. FROINES: Well, I say all this because -- and I'm sitting here looking straight at Paul Cammer -- because I would rather not have the Board tell us to go back and hold a workshop. It seems to me that that sets a bad precedent.

DR. GLANTZ: Well, but the thing was with perc, I think we all agreed that that was one that sort of fell through the bureaucrat cracks as far as the old procedures to the new procedures, and I really do think that was a special case.

MS. SHIROMA: Speaking of perchloroethylene, would you like the Office of Environmental Health to --

CHAIRMAN PITTS: I was just going -- we have a

question, I don't know how your flights are involved. Would you like to take a short break, it's noon, or would you like to go right ahead and handle the perc and then possibly we could adjourn at a reasonably early hour? It's up to you, the Panel.

DR. BECKER: Why don't we finish it off now.

CHAIRMAN PITTS: Why don't we go ahead.

Okay, well, let's go ahead with this and go to the next item, fine. Let's go to the discussion of the outcomes here of the workshop on perc.

And now, will you be prepared now to discuss this?

DR. MARTY: Yes. To my left is Dr. Lauren Zeiss who will do most of the discussing --

CHAIRMAN PITTS: Yes, good.

DR. MARTY: -- and answer most of whatever questions that you have. I do want to say that as a result of the February 4th workshop, there was some activity on OEHHA's part in reevaluating the cancer potency, and Dr. Zeiss will discuss what took place and the results.

CHAIRMAN PITTS: Fine.

Dr. Zeiss, do you have any notes there as to who attended and so forth?

DR. ZEISS: Yes, I do.

CHAIRMAN PITTS: And you're going to read

that?

DR. ZEISS: I can go through that.

CHAIRMAN PITTS: If you would just briefly go through that so we have a clear feeling, the Panel has a clear feeling of who attended and what was involved. Thanks very much.

DR. ZEISS: All right.

So, on February 4th there was a workshop held on perchloroethylene in Berkeley. And basically we assembled a panel of senior staff scientists of OEHHA and also with Dr. Froines, Dr. Dale Hattis of Clark University who is an expert in pharmacokinetic modeling, Professor Allan Smith of UC Berkely who is a professor of epidemiology. Dr. Becker also attended the workshop, and we also had extensive attendance by individuals from industry, the state, and other interested parties.

The main focus, the main purpose of the workshop was to discuss what the best value should be for perc. Now, in the report there was presented a range of values. The focus of the workshop was to look at the best value, and key to looking at that was information on metabolism.

We had presentations by DOW Chemical, ICI Chemical, the Halogenated Solvent Industry Alliance. And in their presentations, they looked at many of the key

issues that were addressed in the report. This included presentations on mechanism of action, cancer bioassy, strength of epidemiology data, and pharmacokinetics. But again, the focus of the workshop discussions was on the selection of the best value.

There was some new in vitro data presented at the workshop. Dr. Reitz of DOW Chemical presented some preliminary data developed after the report had been accepted I believe by the SRP. There was data on perc metabolism, in vitro data on perc metabolism by mice, rats, and human liver data.

Now, these data are qualitatively consistent with the mouse being a more rapid metabolizer of perchloroethylene than rats or humans. We asked Dr. Hattis who has several different pharmacokinetic models, including the model developed by DOW Chemical, we asked him to quantitatively look at this data. And he found that the in vitro data for humans was consistent with the model and with the data that we were using in that model. So the human metabolism data that was presented was consistent with that. However, the data for the mouse was not consistent with the pharmacokinetic model of DOW. So that was an important factor. So there was this inconsistency within the in vitro data.

The report presented interesting data;

however, it was wasn't peer reviewed, it was preliminary data, and I think the work group saw it as such, the workshop panel. So that there was a consensus I think I can say that the panel felt that the information was in general useful, but the degree of usefulness for actually looking quantitatively at what might be occurring and what a best value might be was extremely limited in that regard. So overall, we found that the in vitro data which has yet to be peer reviewed did not provide an adequate basis for the selection of a best value.

Now, there was also extensive discussion on the data in humans indicating metabolism, I'm talking about in vivo data, occupational exposure study and controlled exposure studies. The OEHHA document uses the pharmacokinetic data from a Japanese study to establish the best upper bound estimate of the fraction of perchloroethylene metabolized, and there was a lot of discussion over what studies should be used to select the fraction of perchloroethylene metabolized. Dr. Reitz of DOW argued that the Monster data should replace the Ikeda data for this purpose, and the panel discussed pros and cons of one data set over another.

Staff, after the workshop, OEHHA staff, looked at the consistency of the human data sets and whether or not all the data could be combined. And as part of this,

this involved the Monte Carlo simulations using the pharmacokinetic model, and this is basically the pharmacokinetic model of DOW. The results of this analysis is that at high doses, say of order of 50 ppm, the human data are fairly consistent and all indicate metabolism, the amount of perchloroethylene metabolized of order 1 to 12 percent. So they hung together at high doses.

At lower doses there wasn't complete consistency across the different data sets, with some data sets indicating much greater metabolism, up to 35 percent. Each data set has its own problems, so there was no clear reason for choosing one data set over another. So consequently based on this analysis we didn't find a compelling reason to change our approach in calculating the best value.

However, we asked Dr. Hattis to look again, rerun his model and look again at the data set that we used to estimate the upper bound for the best value. He did this. He is using a slightly modified pharmacokinetic model from the one that he used a few years back, the one on which we're basing our original best value.

The result of this analysis was that instead of finding that 25 percent of inhaled perchloroethylene could be metabolized or is metabolized by humans, he found that 18 percent is metabolized. So this would result in a

slight change in our upper bound, our best upper bound estimate from 54 times 10 to the minus 6 per ppb to 40 times 10 to the minus 6 per ppb. And so we recommend using this new value as the best value.

But we want to reiterate that we recognize the uncertainties in determining a potency value for perchloroethylene. So in the document we have presented a range of values, and we would encourage the Air Board to look at this range, and we would offer assistance in determining how one can or the information in this range and as further information becomes available, how to use this range in developing risk management options. So we would like to work with the Air Board to use this range to a greater extent. Thank you.

CHAIRMAN PITTS: Thank you.

Any other comments?

DR. GLANTZ: So am I to understand that from our point, I mean, there are certain things that the Board, the Air Resources Board has to worry about and has gained from this. But from our point of view as the SRP, it sounds like the bottom line is that we don't really need to reconsider the report that we've approved; is that true?

DR. ZEISS: Yes, except for the percent metabolism, the change in the percent from 25 to 18 percent.

DR. GLANTZ: Okay, but that would be in the nature of a technical correction. It's not something that would cause us to reopen our proceedings on the report that we've already approved; is that true?

DR. FROINES: I think that's a fair statement.

DR. GLANTZ: Okay.

DR. FROINES: I think that there's subtlety in what she said though insofar as -- what is the metabolism range you're currently operating with?

DR. ZEISS: I believe around three to --

DR. FROINES: I thought it was five.

DR. ZEISS: Five to 74, it depends on how you're calculating percent metabolized, but of order of 3 or 5 to 74.

DR. FROINES: I think that there is a distinct problem here. I basically agree with Lauren that the 18 percent figure is an appropriate value.

DR. GLANTZ: Is or isn't?

DR. FROINES: It is. It is an appropriate value. But I just had one other comment to make about it. And that is that there are four data sets, the Ikeda data which gives you the upper bound which is the number that they're using; another Japanese study; a study by Monster which has a problem because it only has four -- there are a number of problems with it, one of which is there are only

four people in the study; and the Fernandez data. And the question is is which if any is correct?

And at some level I think it's fair to say that we don't really know. We really don't know. And some are better than others, but there are problems that can be raised about each of them perhaps. And so in a sense what we're doing is we're making a best guess. But at the current time, I think it's fair to say that we don't have the goal standard, if you will, for how much perchloroethylene is metabolized in humans, so that there is significant uncertainty in what is going on, and as far as I'm concerned that the decision by OEHHA to basically stick with the value that they selected is entirely appropriate.

It's a very reasonable data set, and it wasn't shaken during the point of the discussion at the workshop. The people really did have differing points of view. Dick Reitz, who is an extremely fine scientist for DOW and one of the best in the United States when it comes to pharmacokinetic modeling, there's absolutely no question about his merit and scientific capability, really does prefer the Monster data. And others, including Hattis --

DR. BECKER: I thought it was two to three percent.

DR. FROINES: Well, something like that. But

I think that Hattis, who has looked at all of it and who is clearly the leading person in this area in the United States at this point, I think felt more comfortable using the Japanese data.

So I think that it's appropriate to use what we have. It's appropriate also to understand that there is a range, and finally that there is more experimental work that's required to ultimately resolve the question.

Is that fair?

DR. MARTY: I think that's very fair.

MS. SHIROMA: Could I just consult with Lauren and Melanie for a moment and we'll get right back to you folks with this discussion?

DR. MARTY: We think it's appropriate for us, OEHHA, to submit something written regarding the discussion that Lauren just gave, or the presentation and including the data that was presented at the February 4th meeting and then our reasoning for using the 18 percent.

DR. FROINES: I think that a brief clarification of what you think about the four data sets would be very valuable to give. So we don't try and redo the workshop and all the arguments right now, it seems to me it should be in writing so people can study it. Because it's very complicated and difficult, and it seems to me this is probably not -- we should have something to read

before we talk, if we could do that.

DR. BECKER: And there was also discussion about surface area corrections too in there.

MS. SHIROMA: Yes.

DR. BECKER: I would include that also because they were, to me it was very interesting to see what the data looked like at high dose levels and low dose levels. And it seemed to me that that needed to be a point, that there was contention on the part of people of what it was like at a high dose, what it was like at a low dose. So I would recommend that you write it out and deal with the surface area correction which they discussed as well as the percent metabolism which made sense.

And I, just as a person who, just as another person who was there as a member of the panel, I thought that was a very useful exercise, and I really encourage that because it made it a lot easier for me to understand exactly the data that was being presented and what the controversies were about, and then it was very valuable to see both sides present the information and have it done in an open forum. I found that to be very valuable and very rewarding. And then I think it would be appropriate as a model here to then have that written up and have us as a group come back and reach some formal conclusion about it.

DR. MARTY: I might add that we did tape it.

DR. FROINES: Yes, but I think Lauren can summarize it.

DR. ZEISS: You don't want to listen to several hours?

DR. FROINES: Towards the end of the day you got pretty much, people were arguing points of view.

I think it's very important to look at the issues around the model -- not around the models but around the metabolism, and be clear about issues of saturation at high dose and what have you, so that people feel some measure of confidence in what decisions they're being asked to make. And I think that one could argue that a range is a better way to go than a specific number. But to the degree that we feel -- for our purposes to basically agree upon a number, then it seems to me we're going to have to make a decision.

DR. SEIBER: Is the discussion here whether we need written minutes from the workshop, a summary of the workshop? Is that basically what we're discussing?

DR. FROINES: I don't know because I don't know the legal part. Because then the question comes is does what you write up then have to go out for comment? And I assume, again I'm looking to Paul who I think I know what his answer would be. But your judgment on that is -- I don't know what the answer is to it.

DR. SEIBER: The alternative would simply be to have a written summary of what was presented orally here, that I could certainly support. But I'm a little concerned about going the minutes route without having that iteration of the participants making comments.

DR. FROINES: I don't think it should be minutes. Minutes would just confuse everybody, including the participants. You know, when you read the minutes, they're never as clear as what you thought was being said.

DR. GLANTZ: Well, then what are you saying we should do to bring this to closure? I mean, I agree with Dr. Seiber. I haven't heard anything that makes me think we want to reopen this as an issue before the Panel. So what can we do to bring it to closure, at least as far as we're concerned?

MS. SHIROMA: Well, our thought was that, as Melanie was describing, that basically they would draft an addendum to the Part B which would summarize the discussion at the workshop plus append the information that was provided at the workshop with a recommendation for your review and approval. And in the interim, we would go to our board, in fact on April 9th, and give them an oral status report of the workshop and the work in progress.

DR. GLANTZ: But as somebody said, does that have to go out to public comment? Because I mean, we have

this letter from this lawyer who clearly has a more pessimistic view of the quality of your decision than you did. I mean, I don't want to have to get into a whole big long discussion about this; we'll use up a lot of your resources and ours to no useful end.

DR. FROINES: I'll say one thing about what happened at the workshop. I think that Lauren and George have some of the most qualified scientists that I have ever seen on any issue, and I think this panel should feel very confident in the thoughtfulness and the scientific rigor of their deliberation.

DR. GLANTZ: But still, what should we do? How should we proceed to bring this to closure without making a lot of work for people?

MS. SHIROMA: Okay, we were just recollecting the direction from the Board. And to paraphrase, the direction was that they wanted the OEHHA to conduct a workshop with the various scientists present, that if based on that workshop the best value were to change, then to bring that back to the SRP for approval and then to give a status report to the Board.

So in that context of what the Board directed all of us to do, I guess our thought at this point is that the OEHHA will go ahead and write up a short summary as an addendum, present that to you, and then finalize the work.

DR. GLANTZ: Will that go out to public comment or that will just be a report?

MS. SHIROMA: We hadn't anticipated another public comment period.

DR. GLANTZ: Okay. So basically before the next meeting we'll get a short addendum to Part B that we would then say, yes, this is okay with us to add this to Part B; is that what you're saying? Or we would just take note of it, or what would we, after we get it what would we do with it?

MS. SHIROMA: We basically need to have you focus on the analysis that was conducted by OEHHA and assure that you concur with that analysis and the conclusions reached.

DR. GLANTZ: So, would the formal action then be that you will send a letter to us or a report to us, more as an information item, and then we would read it and maybe say we have taken note of this and have no problems with it rather than any sort of formal "not seriously deficient" kind of stuff? Is that what you're saying?

MS. SHIROMA: That's right, that's right.

DR. GLANTZ: Okay. So this would come to us in the nature of an information item rather than an action item? I mean, things do come to us for sort of our note and discussion from time to time. Is that how you're

saying this is going to be handled?

MS. SHIROMA: Because the best value is changing, we will need your concurrence on that, if you agree. So it's not just an informational item.

CHAIRMAN PITTS: You raised an interesting point, the numbers will change. We have had the workshop in detail, and it may well be -- I'm a little uneasy in not sending it out to public comment. I think it should go to the public. It may slow by a month or two or three, whatever the process is, but it should go public, and that the Panel -- this is just my personal opinion, I want to hear what the Panel, however you want to go. My feeling is though it should go out for public comment and then should be, the comments and the public comments, that should come back to the Panel and that the Panel formally should make some decision on how it will be handled.

MS. SHIROMA: If that's the direction of the Panel, we --

CHAIRMAN PITTS: Well, I'm just sort of tossing that out. I'd like to hear the Panel's opinion. That's just, not speaking as the Chair, speaking as a Panel Member. And there's a factor in here too that was extremely important and brought up in this whole question, that is these numbers really are significant in terms of the management sides. I don't know where these two numbers

lie in terms of the so-called, you remember the bright line? I always thought that was from Fordham, that was the backfield at Fordham about 40 years -- never mind, that's another football story.

But the bright line, you see, maybe it's Washington these days, but there's a line, and if the number is above the line certain things take place, and if it's below the line certain things don't take place. And it's an actual break, I mean, it's a mathematical discontinuity at that line basically, you don't have a trend. And this is important enough that -- and this is a very serious issue. If it's below it, it's okay; if it's above it, bingo.

So the whole matter should be treated with a great deal of thought and procedurally in such a way, sort of slow and steady wins the race in the sense that it be done in an appropriate fashion, plenty of comment, so when the final decision is made -- whatever it will be from the Panel, and we won't judge it now -- it will be a decision based on input from all, as we had in the past. It will be just as though we saw it in the beginning and had raw information.

Would that be okay? How does the Panel feel about that? Is there any problem with that?

DR. SEIBER: I see your point, Jim. And I

tend to agree, the more public review of what we do the better. But in this case it seems to me OEHHA was giving us a recommendation, not a summary of the entire workshop but their recommendation based on what they heard at the workshop, and we're simply asked to concur or not concur with their recommendation.

Now, that's not to say that they quoted accurately what somebody said at the workshop, that's a question of minutes and proceedings from a workshop. So I guess even though I tend to always go on the side of more slow and public comment, the more, the better, in this case it just didn't seem like it was necessary because we're concurring with their opinion, not with the consensus of all the participants in the workshop. I don't know, maybe I'm missing a fine line here.

CHAIRMAN PITTS: How do you feel?

DR. FROINES: If we want to take that course, it's perfectly reasonable.

DR. MARTY: I think it is worth noting that none of the arguments have changed substantially, if at all.

DR. GLANTZ: Yes, see, my concern in this is it sounds like basically what they've done is made a technical correction. I haven't heard anything which is qualitatively different. It's that a couple of numbers

were changed based on better information.

DR. FROINES: We went from oral to inhalation, which is the preferred.

DR. ZEISS: There was also a slight additional thing in the Hattis model.

DR. GLANTZ: Well, I would suggest the following, why don't we do this. They can let them write the report and then let -- why don't we leave it to the staff and the ARB's lawyers whether to just send it back to us for us to take note of it or whether there's a need for some more. Because this thing has been very controversial, and it was all, again, basically a sort of accident of this transition to the new process. And if the ARB attorneys think it would be worth having this go out, you know, it's not going to be a long document so hopefully it will not precipitate a thousand pages of comments. And then it can come back to us at the time which is deemed appropriate.

DR. FROINES: I just want to say one thing. The person who made the suggestion about the written comments was Genevieve, and it seems to me that we as a panel can decide that we have heard, had sufficient discussion, following on Jim's point, and say we don't need written comments and we are prepared to go with that recommendation and not proceed further. So there are really two choices for us as a panel.

DR. GLANTZ: Well, I'm satisfied with just saying that this sounds reasonable to me and leaving it at that, if that's something the staff is comfortable with.

CHAIRMAN PITTS: Well, I think I have the feeling myself, it's sort of a feeling that, it's almost in fairness and in having gone to the major effort of holding a conference and having the distinguished scientists speak from both sides that, I'm not sure that what is lost by not going out to public comment and going out in hearing again, this is a proposal. Because after all, it's a major issue. And if it's a matter of a month, I mean, we'll read it, we should have the material, we should be able to examine it, and I think it's important to maintain confidence that we have gone through the process.

Let's put it another way, we've gone through 90 percent or 95 percent. It would be a shame not to go the extra route and put it out to the public, comment on it. And then we can come back, and it may very well be that we will say exactly what you said, that this looks perfectly good, we agree. But there's a chance it may not. And for the record it would seem that it might be useful to go ahead and put it out.

But I'm prepared to take the vote of whatever the Panel, however you'd like to play this.

DR. FRIEDMAN: What sort of report were you

envisioning? Just a couple pages, not a big --

CHAIRMAN PITTS: Oh, no, I'm not expecting another report. We may get one back in public comment, but, no, it would be basically a report of what you've told us with whatever backup material you'd like to attach to it that may back up the statements of two pages, and then to the degree that the experts in our panel can go over this and say it looks fine, we'll read the public comments again on this several pages and then prepare to act on them.

DR. SEIBER: How about an alternative, Jim, where they prepare the written comments, we take a look at it and then decide after we see it whether it needs to go out for public comment. After all, if it's going to take a month it sounds like we might be here at another meeting, our next meeting with that document and the opportunity to discuss it then.

CHAIRMAN PITTS: Well, I think that maybe what I'm reflecting is actually having met some months ago with the Chief of Staff of the EPA, Brian Runkel, and with representatives of the industry and the OEHHA, and my sense of this was that it was really a matter of concern and importance to the industry and I think justifiably so within the frameworks of the procedure. This is why the workshop afterwards was a problem; that won't happen again.

But that there was a feeling that we did have

a chance to look at the last final value -- that is the public to respond to the last final value that in fact would be evaluated or voted on or approved by the Panel. So there is a great deal of interest in this, and it does in a sense, does maintain a tradition which I hope we will maintain of being sure that we do get, within the framework of our operation, the public comment of the type that this would represent. So it's on that basis.

And if it's a month, I don't really see -- or whatever the time would be. And there should be adequate time I might add for public comment too. If this is to be done it should be done as though we've actually made a major change in the document. It may not be, but it should be in that context.

DR. BYUS: I agree. I certainly would like to see the written summary, I think that would be very educational for me.

DR. WITSCHI: And the comments.

DR. BYUS: And the comments. But the issues were complex scientific issues, and I'd like to see -- I'm sure you did a good job, but I would like to see your analysis.

CHAIRMAN PITTS: Yes, this is not a criticism.

DR. BYUS: I mean, if you're going to do it, you might as well send it out for comment for another

however long it takes to make sure there's no problems. If it takes another month, it takes another month.

MS. SHIROMA: Okay. Just so that we definitely understand, in terms of the overall perspective here that in listening to Lauren Zeiss's presentation to you, at this point her arguments and OEHHA's arguments sound reasonable as far as a change in the best value. In the meantime in terms of process, you basically would like a short written summary with a discussion of the reasons why for the small change in the best value and regarding whether or not there was any new evidence provided with a, perhaps a simultaneous SRP review and public comment with enough time for receiving those comments and having time to look at them and for us to be able to discuss them with you.

CHAIRMAN PITTS: That's correct.

MS. SHIROMA: Okay.

DR. GLANTZ: If I could just, if we're going to do that, probably what we should do when we do this is we would slightly amend our findings to change this number. That would be the formal action we would take I guess. Is that true?

CHAIRMAN PITTS: That's a good point. That's a very good point.

DR. GLANTZ: So the thing that would come back

to us on the agenda would be an amendment to our previous findings based on the results of this workshop. Is that a true statement?

MS. SHIROMA: Yes, that's basically the upshot.

DR. GLANTZ: So why don't you do the following. In the report that you submit to us it would be a recommendation from you that the findings be amended based on the information from the workshop and then a justification for those changes. And then that could be sent out, that would hopefully be not a terribly long document. That could then be made available to the public and then come back to us, and we could simply vote to amend our findings. And that way it's nice and clean.

It that okay procedurally?

CHAIRMAN PITTS: Is that agreeable to the Panel Members?

Fine, then we'll go ahead.

DR. FROINES: When would we take it up, April or May?

CHAIRMAN PITTS: You've raised an interesting question because as I understand it from talking to Bill Lockett, the meeting might be several months away, the next meeting, because --

DR. BYUS: April 14.

CHAIRMAN PITTS: Well, it's listed, that's what I have in my little black book, but I understand we may not have a -- we do not have another compound coming up at that meeting.

MS. SHIROMA: That's right.

CHAIRMAN PITTS: So this ought to be put then in the context of the timing.

Bill, would you like to comment on this?

MR. LOCKETT: Mr. Chairman and the Panel, the next compounds coming up are acetaldehyde and the BAP lead and the diesel exhaust. But those are heading for workshops this summer, and so when those will come back to you will be in the fall. So the agenda items for the Panel are not clear at this point as to when there would need to be a next meeting.

Now, OEHHA is working on the cancer policy, and the Panel has indicated an interest in the cancer policy. That's another possibility.

MS. SHIROMA: Overall, I'm thinking in terms of timing to provide these folks sufficient time to write the document, have a public comment period of perhaps 30 days and simultaneous review by all of you and time to receive comments and so forth, that perhaps May would be the best.

CHAIRMAN PITTS: I think I have the 21st of

May. Do the rest of us have that down as a potential day?

DR. BECKER: Thursday.

CHAIRMAN PITTS: Thursday the 21st. Would that be reasonable time also then to send an agenda item?

DR. ZEISS: Sure.

CHAIRMAN PITTS: To bring this up as an agenda item, the perc, the cancer policy and other items that may be relevant.

MS. SHIROMA: And a staff report on the cancer guideline work that Dr. Zeiss is heading up, is that what you were saying?

CHAIRMAN PITTS: All we were saying, this would be one item then, a reexamination of the perc. Two, whatever. I'd like to hear what you propose would be on the agenda, that's what I'd like to hear. What do you propose to have on that agenda in addition to the perc?

DR. BECKER: What happened to the pesticides? We haven't heard about the pesticides.

MR. LOCKETT: The Department of Pesticide Regulation is apparently reexamining their 1807 program, so it might be timely to do that as well.

DR. BECKER: Why don't we invite them on the 21st as well.

CHAIRMAN PITTS: That would be very useful.

DR. GLANTZ: What a waste of time.

CHAIRMAN PITTS: Now, just a minute, in the invitation I would formally like to ask what happened to, was it methyl parathion that was next on the list? Remember, we raised that question some time ago. Let's raise the question again when the invitation goes out, would they specifically discuss the compound, their list of compounds, methyl parathion, which was under discussion two years, I think it's almost two years now.

DR. GLANTZ: Well, I actually now that you bring it up have an alternative suggestion, and that is that -- I think the pesticide component of AB 1807 is a joke. I've been on this panel a long time, and we've seen one, that they never acted on. And I would like to suggest that the Panel send a letter to the appropriate people, including Sally Tanner, the author of this legislation, simply saying that the Panel has been in existence for however many years it's been and there has not yet been a single pesticide process through to conclusion and suggest to Assemblywoman Tanner that perhaps they would like to simply repeal the pesticidal portion of AB 1807 or do something because the legislature should not think that anything is happening. It's a joke.

And I think, frankly, having had several meetings where the pesticide people came before us and assured us that pesticides never drift and that pesticides

are good for you and things like that, I think bringing them up here is a waste of the plane ticket. I mean, I'd rather see -- as a taxpayer I think it's waste of time to even bring them here. I think we could much more productively simply fairly loudly point out to the people in the administration and to people in the state legislature that that aspect of this law is simply being ignored.

DR. FROINES: I think we ought to have Stan Glantz go up with the ARB and discuss this issue.

DR. GLANTZ: Well, the problem, the ARB isn't the problem.

DR. FROINES: He would love it.

DR. GLANTZ: I mean, I'd be happy to do it, but the ARB doesn't seem to be the problem.

DR. FROINES: I just have an informational question. Is the pesticide program, is it now part of Cal EPA or is it still part of the Department of Food and Ag?

MR. LOCKETT: Right, thanks for the question.

CHAIRMAN PITTS: Did he set you up?

MR. LOCKETT: Yes, very nicely.

DR. GLANTZ: You're supposed to say, I'm glad you asked the question.

MR. LOCKETT: Right, I'm glad you asked that, Professor Froines. The Cal EPA reorganization which was

approved by the legislature took from the California Department of Food and Agriculture and created a Department of Pesticide Regulation which now resides within Cal EPA. An appointment has been made, there is a new director. My suggestion is that DPR be invited to come and make a presentation about their 1807 program before we go forth beyond that.

CHAIRMAN PITTS: I think that's fair enough.

DR. GLANTZ: Uch.

CHAIRMAN PITTS: Well, it is fair enough. Then is then and now is now. But I would say though --

MR. LOCKETT: Give the new director a chance.

DR. GLANTZ: Grrr.

CHAIRMAN PITTS: Well, this is an opportunity to also say at this time in this letter of invitation that Stan's right, that we spent a great deal of time, the Panel did, on ethyl parathion. I'll never forget your comments about babies not being able to metabolize that up to six months.

DR. BECKER: Or was there data.

CHAIRMAN PITTS: Yes, was there any information on this. And a lot of effort went into that document. It went through the Panel here and then disappeared.

So why don't we just get the history of that.

Politely just say -- and that's a good reason -- here it is, this has been done, how do you see the possibilities or what actions do you see might be taken? And then the next one was to be methyl parathion, because I know we talked about that. That's on our list, and then there's a list of others. Ask them questions in the invitation so we can direct in part to get answers.

After that, Stan, after that, then we'll see how --

DR. GLANTZ: We've been doing this for years.

CHAIRMAN PITTS: Well --

DR. GLANTZ: I've gone and met with these people, and this is all deja vu all over again.

CHAIRMAN PITTS: Well, Yogi, I'll tell you.

DR. GLANTZ: But it's just a waste of the taxpayers' money. I think that one thing we should say in this letter is that the Panel is troubled that the contrast between the ARB and the pesticide portion of AB 1807 is quite dramatic, that there have been however many, 20 or so compounds processed by the Air Resources Board, that there has not yet been a single recommendation of this Panel which has been ignored by the Air Resources Board. And of the one pesticide that finally tortuously made it through the process, it was then simply ignored. And this, you know, it's a charade.

CHAIRMAN PITTS: Well, other than that last statement --

DR. GLANTZ: Other than that I think the process is working.

CHAIRMAN PITTS: Other than that charade statement, that could very well be put into this letter, Bill, which we could draft. We could draft a letter --

MR. LOCKETT: We'll be glad to work with Dr. Glantz.

CHAIRMAN PITTS: -- without the charade part.

DR. FROINES: I don't mean to be the right wing.

DR. GLANTZ: A new role.

DR. FROINES: I love the position you stake out on this one.

DR. GLANTZ: Well, you haven't had to go to all these meetings with these people. As you remember a long time ago, I was going to sort of encourage them to be cooperative. My diplomacy skills totally failed.

DR. FROINES: I just had a different question. We've had DBCP as an nematocide and we had EDB as an nematocide, and we've also had telone as a nematocide, and now it's my understanding that there's widespread use of methyl bromide. And methyl bromide methylates DNA and may or may not be a carcinogen. And at some point I would like

to know something about how is that nematocide issue being addressed because we seem to go from one carcinogen to the next. And including methyl bromide is a gas as opposed to the others, so it may disperse more readily. But that seems to me to be an issue which has been going on for at least 10 or so longer years. It would be worth knowing.

DR. SEIBER: Yes, I think methyl bromide is also harder to detect at low levels, so that detection limit is fairly high, and that has an impact also on what kind of an assessment you can do. Because you get a lot of zeros with methyl bromide simply because the detection limit is so high.

CHAIRMAN PITTS: Would you also put in metam-sodium then, isothio cyanate? Well, isn't that being used? Now, wait a minute, just out of curiosity, this is just an interesting question, that's the saga of the Sacramento River, right?

DR. FROINES: Methyl bromide and metam-sodium are the two replacements.

CHAIRMAN PITTS: That's right. It's a replacement, precisely.

DR. GLANTZ: Well, you know, I had written up a letter around the first of the year that I never sent to Sally Tanner saying, well, another year has gone by and we still haven't seen a pesticide. Maybe I should send it.

DR. SEIBER: Jim, I think it would be real useful to have Mr. Wells -- is that the gentleman's name?

MR. LOCKETT: Yes.

DR. SEIBER: -- up here and explain this and answer questions just like was raised here. And we might also want to consider down the line a workshop on pesticides in air and exposures from pesticides. Because you know, when you talk about pesticides you go from methyl bromide up to paraquat, a tremendous span there.

CHAIRMAN PITTS: That suggestion, I can see beams and nods around the table, I think we should proceed with that. Could we go ahead and discuss that with you, Jim?

DR. GLANTZ: Yes, perhaps we could have our own workshop and come up with our own list.

CHAIRMAN PITTS: Sure.

DR. GLANTZ: Could we also request that the director of this office come and not send some low-level person obscure and unnamed which has been the tradition.

DR. FROINES: That's like Bill Clinton's wife talking about women staying home and baking cookies, you know, some low-level person. I mean --

DR. GLANTZ: Well, but what happens is in the past they always send some very nice, well-meaning staff person to come and get yelled at, and it's a person who has

no authority to do anything.

MR. LOCKETT: We'll work with you on the draft.

So May 21 is the next meeting?

CHAIRMAN PITTS: Is it agreed then? That was in our calendars, Lane very efficiently got us nailed, so it will be the 21st. But we will now not have the meeting, we can cancel the meeting that was on the --

MR. LOCKETT: April 14.

CHAIRMAN PITTS: April 14th.

MR. LOCKETT: And the May 21 will be in Northern California.

CHAIRMAN PITTS: And May 21 is north. Agreed?

DR. BYUS: The only problem with that meeting, I believe it's the same week as the AACR meetings in San Diego, so now by switching it back up north it might be harder for me to get there. I'm going to go to the cancer meetings in San Diego. But please don't let that interfere.

CHAIRMAN PITTS: It might be a fun meeting. It sounds like it will be interesting.

DR. BYUS: No, I know it does. But I'll fly.

CHAIRMAN PITTS: We'll fly you up and back if we have to. If you're down in San Diego, take it. There's an airport close by. Landing is no fun though, right?

Coming into San Diego and that landing is always a thrill.

DR. BECKER: Is there an SRP meeting on June 2nd?

CHAIRMAN PITTS: No, no. No, there's no meeting June 2nd.

And as far as I'm concerned, Bill, we're looking at our calenders, we're meeting May 21st.

MR. LOCKETT: Right.

CHAIRMAN PITTS: June, that was floated by at one point.

MR. LOCKETT: Sixteen turned out to be the next best possible date.

CHAIRMAN PITTS: Okay, June 16.

MR. LOCKETT: Oh, but that was only because Dr. Byus --

DR. GLANTZ: But we won't have anything on the agenda though.

MR. LOCKETT: No, we don't have anything on the agenda.

CHAIRMAN PITTS: Well, if there's nothing on the agenda there's no point in having this.

MR. LOCKETT: And Dr. Byus is not available, so that was it. There was no date in June when everybody was available. So the least, or to put it the other way, the most people could come was on the 16th or 18th.

CHAIRMAN PITTS: But is there a need for a meeting in June if we have this May meeting? Would it not be better to wait?

MR. LOCKETT: Yes, it sounds like we won't need one.

CHAIRMAN PITTS: Say August, which would be a reasonable time because at that time we should have acetaldehyde, because that basically would be --

MS. SHIROMA: I don't think we'll be ready by August because we'll probably hold the workshop itself in June, and then we need time to re-compile the document, go out for a second comment period, so I think August would be too soon.

CHAIRMAN PITTS: Would it be feasible to simply say let's have the May meeting, we'll have the meeting in May, see what subjects for discussion come up, because there may be a number of agenda items that are worth discussing that will arise in the May meeting, and then we can formulate those and then decide.

MR. LOCKETT: And then we will poll.

CHAIRMAN PITTS: Then we'll poll the members and see what we'd like to have on the agenda. Okay? Is that fair enough?

MR. LOCKETT: Fine.

CHAIRMAN PITTS: Are there any other items for

BEFORE THE SCIENTIFIC REVIEW PANEL

ON TOXIC AIR CONTAMINANTS

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TRANSCRIPT OF PROCEEDINGS

Thursday, March 19, 1992

Arnold and Mabel Beckman Center
National Academy of Science Building
Irvine, California

Reported by: Diane L. Errick

APPEARANCES

SCIENTIFIC REVIEW PANEL

Dr. Charles Becker
Dr. Craig Byus
Dr. Thomas Davis
Dr. Gary Friedman
Dr. John Froines
Dr. Stanton Glantz
Dr. James Pitts - Chairman
Dr. James N. Seiber
Dr. Hanspeter Witschi

AIR RESOURCES BOARD

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OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT

Dr. Joseph Brown
David Holtzman
Dr. Melanie Marty
Dr. Lauren Zeiss

discussion?

DR. FROINES: Is the meeting going to be in San Francisco though in May?

CHAIRMAN PITTS: Oh, yes, it's north, yes, sir. Yes, sir, it's north.

DR. GLANTZ: What about the ETS lead?

CHAIRMAN PITTS: Pardon me?

DR. GLANTZ: The ETS lead person.

CHAIRMAN PITTS: Oh, the question, yes, there is a question of the lead person has to be established for ETS; is that right?

MR. LOCKETT: Yes.

CHAIRMAN PITTS: All right.

MR. LOCKETT: The Chairman normally does that.

CHAIRMAN PITTS: The Chairman normally points the finger at the individual, okay. Well, I would -- and at this particular time, is that the time appropriate?

MR. LOCKETT: Fine.

CHAIRMAN PITTS: Well, can I -- okay. I hesitate --

MR. LOCKETT: As long as you've got a full panel.

CHAIRMAN PITTS: I was going to ask -- I'm not going to ask for volunteers necessarily, but I've given some thought to this. I would be prepared to ask perhaps,

Dr. Becker, would you be prepared to take on, it's a daunting task, but you're an A player and certainly in the game.

DR. FROINES: What about Stan?

CHAIRMAN PITTS: Pardon? Well, I would, the question, it's a fair question, what about Stan? And if Stan would be willing to do so, that's fair enough. We've talked about this. It may be the Chairman's position of this, actually I think that it might be more, the debate might be actually more effective if Stan were able to come in, you're chair and Stan could put his comments in from the perspective not as the lead person but in fact as one of the members of the Panel who is the expert. And I think this might be more effective all the way around. It's going to be a touchy subject. And if you'd be prepared to do this, Chuck, I think we'd appreciate it.

DR. BECKER: I'm prepared to do that because I'm interested in it.

CHAIRMAN PITTS: Okay.

DR. BECKER: But I would certainly defer to any of the other Panel Members. Maybe there is someone else who would prefer to take the lead.

CHAIRMAN PITTS: Would anyone else be interested in this?

DR. BECKER: I am going to be the one on lead,

because I've already reviewed that.

CHAIRMAN PITTS: That's another, yes.

DR. FROINES: That's a very good strategy.

DR. GLANTZ: Huh?

DR. FROINES: You know, if you get very outspoken and therefore you get to be as the expert and not as the lead, that's a good trick.

DR. GLANTZ: What is this? What? Run that by again.

DR. FROINES: Never mind, I don't want you to get smarter.

CHAIRMAN PITTS: That's okay.

Now, we also need a Part A on the exposure side, and that would be either one of the two Jims.

If you'd be prepared to take that, fine. If you prefer that I take it, I would. It's up to you.

DR. SEIBER: What was the timetable on that?

CHAIRMAN PITTS: Where are we on the timetable?

MR. LOCKETT: Well, they're working on it I think already or starting very soon. But it's going to take a while, so the timetable is summer or later.

DR. GLANTZ: Could I make a suggestion about the Part A. ETS is different I think than a lot of the kind of pollutants we've been dealing with so far. And in

order to make more work for Dr. Becker, I think at this point we could simply have one person appointed, and then as the report takes shape we could look and see if there's a need for a specific sort of Part A lead. You don't think so? Because there's a lot of it -- well, I rescind that. We should do it in the standard way. I nominate you.

CHAIRMAN PITTS: Thanks.

DR. GLANTZ: You're welcome.

CHAIRMAN PITTS: I would indicate to Jim also that either way, either if I were to accept it then I'd expect to get some input from you, and if you were to accept it I would give some input back.

I think you've raised a point, it is a very different system. You now have, it's very much going to be like diesel, this is a combination, it's combined. We have a whole -- and diesel has hundreds of compounds in there, at least 50 or 100, that may be toxic. It's a, what's the term I want, a complex mixture.

And you deal with complex mixtures and particulates and droplets; I'm more of the gas phase chap. And so we'd work together on this. And if you'd care to be lead, fine, I'll work with you. If you'd prefer me to do it, either way.

DR. SEIBER: I'd prefer to be pinch-hitter and let you take the lead.

CHAIRMAN PITTS: Okay, that's final. I'll take Part A then. You're the designated hitter then.

DR. FROINES: Can I ask you, do you have a list of who is who?

MR. LOCKETT: Yes.

DR. FROINES: Do you have it with you?

CHAIRMAN PITTS: You mean for future documents?

DR. FROINES: For the documents.

MR. LOCKETT: I had it with me because Bruce was here, but I don't know if I have it in my case. Just a second.

DR. FROINES: Do you know who is who? Because I frankly don't know what I am. Maybe we should poll the meeting.

CHAIRMAN PITTS: The lunch is ready, but let's finish this off, and then if there are other items. But I want to announce there is a lunch.

MS. DENTON: I just wanted to mention that, John, you are the PAH person. So you're --

MS. SHIROMA: BAP.

MS. DENTON: BAP and diesel exhaust. So those are the ones that are coming up for you.

MS. SHIROMA: Probably towards the latter part of the summer.

CHAIRMAN PITTS: Pardon?

MS. SHIROMA: BAP and diesel exhaust, Dr. Froines is lead on the Part B.

CHAIRMAN PITTS: That's fine. I'd be happy to take lead on Part A because that's sort of my bag.

MS. DENTON: Right, you are. You are, Dr. Pitts.

CHAIRMAN PITTS: Yes, I am, yes, that's fine. As long as you include nitro BAP. And also the nitrocoumarins.

By the way, just as a matter of fact we discovered that, take phenanthrene, right, naphthalene and this phenanthrene now, and if you put it in ambient air or actually in synthetic air you get a coumarin derivative. You stick a nitro on it, it's incredibly, incredibly active in the Ames assay. And hundreds of thousands of activities, units, are out there. Roger Atkinson identified this. It's kind of an interesting gap.

Up to now the mutagenicity in ambient air, you could find 10 percent, and it's in smoke now too, you find 10 percent maybe, added up. And people wonder, what's the other 90? This has been wondered since about 1980. And this really is interesting. The phenanthrene is out there; in some way or shape or form it oxidizes to this O C double bond O with an NO2 on it.

DR. SEIBER: That's real interesting.

CHAIRMAN PITTS: That just came out. It just came out in ES&T as a communication to the editor. And an interesting medical point of view too.

DR. SEIBER: That's real interesting because the plant-derived coumarins are known mutagens and carcinogens. Many are proven animal carcinogens.

CHAIRMAN PITTS: Well, actually we identified, I went back and looked, in '82 our group had a small paper on the fact that you see the analog of the coumarin, we identified that in diesel exhaust in ambient air. The non-nitro was there, benzocoumarin, for example. So this typically, you've got the 4 5 double bond, I mean, you've got the 4 5 double bond in that position, then you can perhaps for example hypoxidize it then hydrolyze it, then you could rearrange to the lactone, and then maybe, maybe nitrate then. I don't know, I haven't talked to Roger. Nitrate first and then it rearranges. But it's a real breakthrough in terms of ambient mutagenicity, a huge breakthrough.

DR. FROINES: We're currently publishing our data now --

THE COURT REPORTER: Excuse me.

DR. GLANTZ: You know, we should probably adjourn.

CHAIRMAN PITTS: Oh, this is sort of off the record.

DR. GLANTZ: I move we adjourn.

CHAIRMAN PITTS: All right, let's adjourn. I just wanted to throw a little science into the end of this.

(Whereupon, at the hour of 1:00 p.m., the hearing was concluded.)

CERTIFICATION

STATE OF CALIFORNIA)
) ss.
COUNTY OF VENTURA)

I, DIANE L. ERRICK, hereby certify that the foregoing pages 1 through 106, inclusive, are a true and correct verbatim transcript of the proceedings as reported by me.

WITNESS my hand this 25th day of March, 1992, Ventura, California.

Diane L. Errick

DIANE L. ERRICK